

Aquilegia

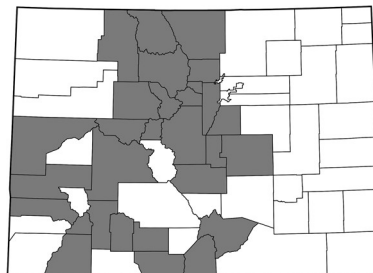
Newsletter of the Colorado Native Plant Society

Volume 42 No. 1 Winter 2018





Hooded Lady's Tresses, *Spiranthes romanzoffiana* Cham. This orchid is broadly distributed across the western portion of the northern hemisphere, from Alaska to England. It has 2-6 basal or lower stem leaves, and an inflorescence of up to 40 small white flowers that are arranged in a tight spiral. *S. romanzoffiana* can be distinguished from *S. diluvialis* by its inflorescence: the lip petals are deeply constricted in the middle and have erose tips; tepals form a hood above the lip, and the inflorescence is densely congested so the rachis is usually not visible (Spackman et al. 1997, Weber and Wittmann 2012, Ackerfield 2015). It can be found in open, wet areas, including moist meadows, prairies, fens, marshes, and bogs in alpine or subalpine zones. *S. romanzoffiana* is pollinated by a variety of bees.



Map adapted from Ackerfield, J. *Flora of Colorado*, p. 565 (2015).

Botanicum absurdum by Rob Pudim



PHOTO CREDITS: FRONT COVER and PAGE 2: Hooded Lady's Tresses (*Spiranthes romanzoffiana* Cham.) FRONT COVER: ©Jim Pisarowicz, photographed January 2, 2018, in a small frozen wetland on the Uncompahgre Plateau. PAGE 2: ©Kelly Ambler, photographed August 15, 2015, on a moist stream bank in the Mount Zirkel Wilderness. BACK COVER: ©Laura Backus, photographed in Death Valley, February 2016. All photos used with permission.

Aquilegia: Newsletter of the Colorado Native Plant Society

Dedicated to furthering the knowledge, appreciation, and conservation of native plants and habitats of Colorado through education, stewardship, and advocacy

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Aquilegia is the newsletter of the Colorado Native Plant Society. Members receive four regular issues per year (Spring, Summer, Fall, Winter) plus a special issue for the Society Annual Conference held in the Fall. At times, issues may be combined. All contributions are subject to editing for brevity, grammar, and consistency, with final approval of substantive changes by the author.

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Featured Story



Super Bloom: Journey into Desert Gold

By Laura Backus

We never intended to write a book, Karen and I, as we stepped out of the car into the roadside wildflowers of Death Valley National Park at the height of the February 2016 Super Bloom. My plan for that week had been to pack warm clothes and a new umbrella for Germany when a sudden trip cancellation opened up the possibility to realize my long-held goal of being in a desert super bloom.

As Karen Churnside told me when she offered to come along, “You now have nothing planned next week.”

We share two grandchildren and were now about to share our love of wild plants. A lucky find at my favorite used book store yielded a copy of Death Valley Wildflowers with enticing pink blossoms of desert five-spot decorating the cover.

We packed Karen’s little green Prius with tents, coolers, and my 25 favorite plant books, and drove west towards the Mojave Desert, skirting the rock slides of recently re-opened I-70.

Death Valley, the hottest place in North America, is a closed basin with elevations ranging from below sea level, where you look UP 300 feet at the sign demarcating sea level, to the 11,000 foot pine-forested summit of Telescope Peak. My one previous pass through Death Valley had been eight years earlier in the plus 100° July heat, too hot for more than a brief sampling of one desert trail. Valley slopes were brown and bare. In October 2015, however, unusually heavy rains led to the floral outburst of the seed bank four months later.

Color, Color Everywhere

The color and diversity of glowing fields of plants we had never seen before astounded us in that first pull-off area: Death Valley mohavea (*Mohavea breviflora*), purple calthaleaf phacelia (*Phacelia calthifolia*) and

crenate phacelia (*Phacelia crenulata*), cowboys’ delight (*Sphaeralcea* spp.), desert holly salt bush (*Atriplex hymenelytra*), gravel ghost (*Atrichoseris platyphylla*), and yellow cups (*Chylismia brevipes* ssp. *brevipes*). Most odd were the rounded mats of turtleback (*Psathyrotes ramosissima*), mimicking the shape of the turtleback mountains yet to come. We went wild with delight, snapping photo after photo.

Down in the valley floor, the visitor center was wall to wall people. Pausing only to collect a handout of best viewing places, we escaped the crowds to rejoice in thousands upon thousands of desert gold sunflowers (*Geraea canescens*) streaming down alluvial fans. Usually, even in stunning landscapes, I’m the only one out of the car, compelled to sample the flora. This time I had not only an herbalist friend, but EVERYONE was out of their cars walking in a daze through shining fields of yellow and green.

Dreamy young couples walked hand in hand pausing to photograph each other amidst the vibrant display. Whole families explored together; middle-aged people brought their aged parents. Some visitors relaxed in lawn chairs, just staring out into the unusual display. Spontaneous smiles were upon all of our faces.

The Desert Five-spot

Before long we came across that wildflower I had most wanted to see: desert five-spot (*Eremalche rotundifolia*). Just like in my second-hand plant book, the five bright pink petals were adorned at the base with dark red spots. In a few individuals we could see tiny matching dark red insects crawling over the inside of the floral cup. Where had these minute creatures been in the intervening months and years since the last big blossoming?

In place of glacial-era Lake Manley, briefly restored in October for dedicated kayakers, salt marsh wetlands ►



Eremalche rotundifolia, Desert Five-Spot

◀ filled the valley bottom. Cottonball Marsh with its gravel bathtub rings of past shorelines drew us in. We got our shoes wet in the continent's driest valley. Salt crystals encrusted the surface, and springs supplied hydrology for saltgrass (*Distichlis spicata*), rushes (*Juncus* spp.), and mesquite (*Prosopis* spp.).

Travel along Badwater Road with acres and acres of desert gold backed by maroon turtleback mountains filled our middle day. Ever curious, we pulled off on side roads to investigate desert sand verbena (*Abronia villosa*) and Arizona lupine (*Lupinus arizonicus*) near three small outcrops of basalt then soothed our feet walking barefoot over the salt floor of Badwater Basin. Strolling up into the gravel fanglomerate cliffs of Sidewinder Canyon, we were rewarded by a lunch stop amidst pink broad-leaf gilia (*Aliciella latifolia*), yellow and white Emory's rock daisy (*Perityle emoryi*), plus the third purple phacelia (*Phacelia vallis-mortae*). Finally, along Artists Drive trail, rose-colored nama (*Nama demissum*) winked out between rocks before we began the 60 mile twilight drive to Panamint Springs Campground.

More Water in the Desert

Our last day began with a leisurely morning reviewing photos, sketching, and writing before trekking up nearby Darwin Canyon, the local water supply. In the initial wash of dry sand and cobble, we passed a large brittlebush (*Encelia farinosa*) and almost overlooked a many flowered mentzelia (*Mentzelia longiloba*) hidden in the rocks. Before long, we saw Englemann echinocereus (*Echinocereus engelmannii*) and white bursage (*Ambrosia dumosa*). With every 100 yards, the canyon walls drew nearer and the habitat wetter.

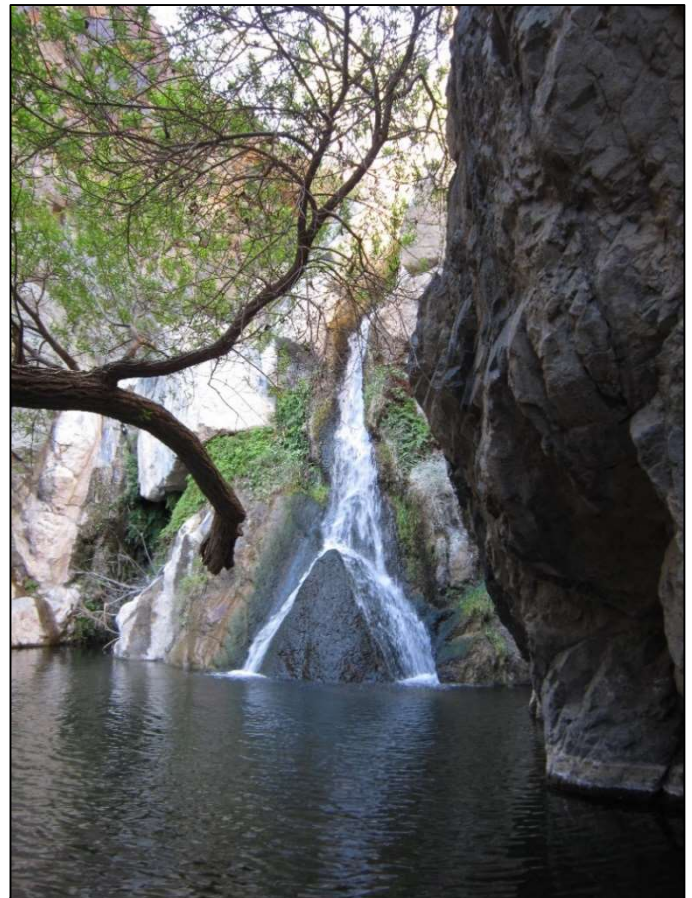
The vegetation transitioned to small pink blossoms of mulefat (*Baccharis salicifolia*) and catkins of arroyo willow (*Salix lasiolepis*). One mile up, we dead-ended at a pool watered by a Y-shaped cascade pouring down fern covered igneous bedrock. To our surprise, three-square bulrush (*Schoenoplectus pungens*), cattail (*Typha* spp.), and watercress (*Nasturtium officinale*) grew in the shallows with yellow monkey flower (*Mimulus guttatus*) nearby. Hiking out, Karen noted familiar medicinal plants: sacred datura (*Datura wrightii*) and Mormon tea (*Ephedra nevadensis*).

Late in the afternoon, not yet sated, we headed the car up Scotty's Castle Road. Visitors were scarce; wildflower beauty was abundant. Several random stops showed us Mojave desert-star (*Monoptilon bellioides*), a lone

(continued on back cover)

Laura Backus is a plant ecologist who has done vegetation studies, wetland delineations, and restoration projects from the Colorado Rocky Mountains to the Andes of Ecuador. You can reach her at laura.backus@colorado.edu. Karen Churnside is an herbalist and nutritionist specializing in using the healing properties of plants in everyday products. You can reach her at chside@naimh.org

Editor's note: Death Valley Super Bloom is available in the CoNPS bookstore. Also, the Super Bloom was still going strong at mid-elevations two months later! Photos used with permission from author.



Waterfall in Darwin Canyon

Botany Basics

ID Skills Rely Heavily on Observation By Mary Menz

Editor's note: CoNPS has a diverse membership — from professional botanists to hobbyists to beginning native plant lovers or gardeners. To meet the needs of members learning to identify native plants, Aquilegia will feature a regular column on basic botany. Following is the first in a series of articles written by Colorado Native Plant Masters about learning to identify native plants.

There are a lot of different ways to identify native plants in the field. Among them are smart phone apps, field guides galore, classes, and surrounding yourself with people who have more experience and knowledge than you do. All of these are excellent resources, but when out flower finding, the best tool the native plant enthusiast has is his or her own observations of a plant in its native habitat.

Taking photographs of plants is excellent. Taking detailed photographs of all parts of a plant is especially helpful. But drawing and labeling the details of a plant is even better for a majority of learners. The kinesthetic process of observation combined with a pencil moving across paper while documenting details learned by touch, smell, and vision works for many people.

It does not matter if you consider yourself a skilled artist. The practice of sketching and labeling plant parts helps people better remember key characteristics regardless of how prettily they are rendered on paper.

It's all about observations and memory.

How to hone your observation skills while sketching:

1. Find a plant you know well. Perhaps it's a Rocky Mountain geranium (*Geranium caespitosum* James).



Carefully observe the plant and its parts using a 10-20x hand lens while in the field. Feel for stickiness. Sniff for fragrance. Note the surrounding habitat and exposure.

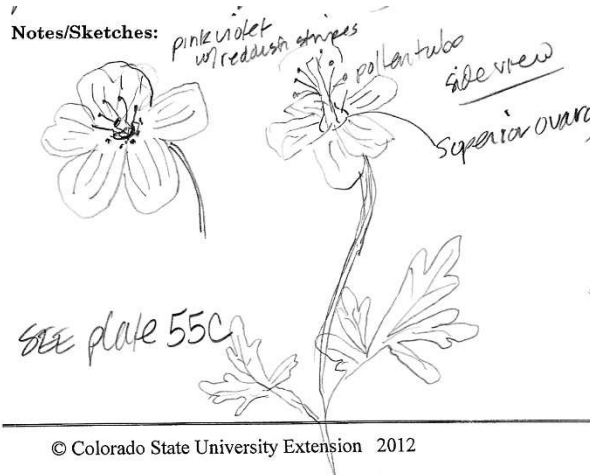
2. Draw the plant and label its vegetative and reproductive parts, however crudely. If you aren't familiar with plant parts, look at the front matter of many guide books or keys for help locating specific parts of a plant. When on private land only, use of a pocket knife or X-ACTO knife can be helpful when locating interior plant parts, keeping the unwritten rules of plant collecting in mind: be inconspicuous as others might not understand what you're doing; be judicious and collect only one specimen; share one plant among several people; and never harvest the last of *any* plant.

3. Take note of hairs and glands and document measurements of sepals, petals and styles, for example. Compare your notes to a dichotomous key of native plants (*Flora of Colorado* or *Colorado Flora*).

4. Do this with several plants you are familiar with and the process will become a natural part of your observation practice, making the task of identifying new plants more routine. By doing this, you will learn relevant terminology and parts of plants will become second nature.

Taking classes like those offered by the Colorado State University Extension offices is helpful, too! For a preview of the program, check out this video online: https://www.youtube.com/watch?v=sIERkfIK0_c&feature=youtu.be

Mary Menz is a Colorado Native Plant Master®. She advocates that all native plant lovers should arm themselves with a dichotomous key and learn how to use it. Photos used by permission from author.



© Colorado State University Extension 2012

Corner

Ranching and Conservation: The Private Option

By Mo Ewing

If you travel west on Route 78 from Pueblo, the road heads arrow-straight to the southwest toward the Wet Mountains. The land is as dry as a bone and sprinkled with tree cholla (*Cylindropuntia imbricata*) until about ten miles from Beulah. There, the road drops sharply from the dry plains and gradually climbs up into the foothills. The world suddenly turns green here, going from short-grass prairie to mid- and tall-grass prairie.

About two miles east of Beulah is 3R Ranch, a spectacularly beautiful cattle ranch owned by Reeves and Betsy Brown, where 6,000 acres of luxuriant meadows roll to the east, and to the west, the ranch climbs through 5,000 acres of ponderosa pine and spruce-fir forests--eleven thousand acres of unfragmented ecosystems from the plains into subalpine.

The Browns came here in 1981 after working a 1,000 acre Texas stock farm raising beef cattle and growing oats. Both ranchers, they met in the Agriculture Department at Texas Tech when they were students there in 1961 and were married in 1962. They decided to move north because they preferred a higher altitude and more agreeable climate. They also wanted to raise Angus, a higher quality of beef which is difficult to raise in the Texas climate.

They looked at ranches along the Front Range from Wyoming to New Mexico. Betsy had grown up on the edge of the Rockies in northern New Mexico. When she saw 3R Ranch she immediately fell in love with it. The ranch had everything they wanted: diversity, altitude, seasons, and water. The ranch was also large enough that they would not have to lease allotments from the government to feed their cattle.

Most Coloradans, when they think of beautiful open spaces, think only of state and federal public lands. Ranching, however, plays a very important part in land conservation. In 2014, of Colorado's total 66.3 million acres, 23.8 million acres were owned by the federal government and roughly 2.9 million acres were owned by 31,800 farms and ranches. The average ranch size was 909 acres.

Ranching is often vilified as being environmentally destructive, but, if done correctly, it can actually benefit natural resources while at the same time conserving large unfragmented ecosystems, areas that would otherwise result in endless development, human sprawl, or 30-acre ranchettes. The 3R ranch offers an excellent example of how cattle ranching can benefit natural resources, and how much of a commitment it takes to achieve.

The Browns currently have a herd of about 450 Angus that they raise for the beef market. For the last 30 years they have been carefully breeding their herd to optimize the genetics of their animals. In order to be successful, they have had to take care of the land as well as their cattle.

Restoring Lands to Their Previous Bounty

Protecting and enhancing the biodiversity of native systems and making a living at the same time is a delicate balance, but when I was land stewardship director at Colorado Open Lands (a state-wide land trust) from 2003 to 2009, I found that many of our cattle ranchers were as good, if not better, stewards of the land than federal and state government agencies.



A view from the ponderosa forest on 3R Ranch.

When the Browns first came to the ranch in 1981 most of the meadows had been overgrazed, resulting mostly in a monoculture of blue grama grass. The ranch sits on the edge of the foothills which would normally be mid-grass or tall-grass prairie, but cattle eat the most palatable grasses first, leaving blue grama which is better adapted to harsh conditions. As a result, in 1981 the Browns needed 16 acres of pasture to feed each cow in their herd.

To bring back the native grasses that should normally have occurred there, they instituted a system of Managed Intensive Rotational Grazing (MIRG). In this highly labor-intensive system, they used electric fencing to separate the pastures into 100-acre plots and then had the whole herd intensively graze each►

► plot for a short period, moving them to the next plot and letting the grasses rest for a minimum of 60-80 days.

Rotational grazing mimics the grazing regimen of bison that moved in large herds, intensively grazing all herbs and grasses in a single area, trampling the sod to break it up, and fertilizing with their manure. As a result of the rotational grazing, the Brown's meadows gradually reverted to mid-grass prairie, without seeding. Biodiversity increased exponentially with the recovery of native grasses: blue grama, sand dropseed, western wheatgrass, sideoats grama, little bluestem and big bluestem. Some exotic species, Kentucky bluegrass and smooth brome, which were there previously, reestablished with the native perennials, but about 80% of cheatgrass was eliminated to the health of the native perennials. Today the grasses are so lush that it only takes 7.6 acres of pasture to feed each cow.

It seems unlikely to me that the Bureau of Land Management, the Colorado State Land Board, or Division of Parks and Wildlife would have had the time or resources to provide the same level of stewardship.

Managing Lands through Drought

What is also impressive is that the Browns were able to accomplish this in the face of the increasingly troubling issue of water and drought. Their ranch has senior water rights to the south St. Charles River which runs through some beautiful canyons on their property. They use this water to irrigate about 500 acres of grass meadows, some of it with center pivot sprinklers, for grazing and to produce hay for winter feed.

In normal years they get water for three to six weeks with their water rights; just enough to grow enough hay; but in the big drought which ran from 2002 through 2004, the St. Charles River completely dried

up. The Browns had the choice of overgrazing the meadows which they had so carefully restored, selling the herd that they had worked so hard to improve over the preceding 20 years, or moving the herd to another state where there was enough forage to carry them through. In 2002, they trucked their entire herd of cattle to several small lots they leased in eastern Oklahoma. They were not able to bring their cattle back to the ranch until the drought ended in 2004.

They faced the same problem again in the drought of 2013, but since it was shorter, they were able to move their cattle to a closer feedlot, 95 miles away, in Swink, Colorado, for only six months.

Finding a Market for Beef

Maintaining a ranch, while adhering to the most desirable conservation practices is sometimes an impossible task. The Browns considered producing grass-fed beef, but marketing it was so difficult that they decided against it. Producing beef requires assuring both adequate prices and reliable markets. A recent study found that the demand for grass-fed beef represents only three to six percent of the total beef market in major metropolitan markets¹. In addition, beef prices fluctuate so widely that it is difficult to make a good living².

To overcome these issues, the Browns purchased stock in U.S. Premium Beef, a closed cooperative which guarantees a market for their cattle and pays premium prices for it. U.S Premium Beef accepts only the highest quality beef and sells it to high-end restaurants in the U.S. and premium markets in nine countries, the largest markets of which are in Japan and South Korea.

Every package of beef they sell has the names of the ranches printed on the labels so that customers know where the beef comes from. The Browns have received occasional calls from Korea asking if the beef sold to them really came from their ranch.

Another example of when best practices are sometimes impossible to achieve is in the use of antibiotics. While on the ranch, the Browns' cattle are solely grass-fed and antibiotics are used only for individual cows when sick. However, because of the level of quality required by their markets, their cattle must be sent to feedlots to be grain-fed before being harvested. At this point, the Browns lose control of the process. Feedlots are high output industries which keep high numbers of cattle in close quarters, resulting in the use of antibiotics preventively to minimize disease. ►



The St. Charles River runs through a portion of the 3R Ranch.

Protecting Landscape-sized Ecosystems

In Colorado, we have chosen to put most of our support behind federal and state government to protect landscape-size ecosystems. We seldom consider the advantages of protecting open spaces by supporting ranching.

Consider the following: 3R Ranch covers 11,000 acres of contiguous grasslands, montane ponderosa pine forests, two miles of the St. Charles River Canyon and its stream corridor, and subalpine spruce and fir forests. In 2001, the Browns began the process of placing a conservation easement on the whole ranch. When completed, these conservation easements will protect the ecosystems on the ranch in perpetuity. In exchange, the Browns have limited themselves to an agricultural building envelope of 30 acres, and currently irrigate 500 acres of land to feed their cattle during the winter. Since the grasslands used for grazing are kept essentially in their natural state, that means that 95% of the ranch consists of natural ecosystems.

One criticism of private versus public land ownership of large parcels of land is that there is usually no public access to private ranch lands. From an ecological standpoint, however, this is a beneficial trade-off because of the prevailing issues on public lands regarding habitat destruction from recreation, fragmentation from oil and gas development, and underfunding of the agencies needed to effectively manage habitat, wildlife, grazing, and timber management.

State officials predict that Colorado's population will grow to nearly 8 million by 2040. This process will create an explosion of development along the Front Range. It is beautiful grasslands, foothills, and mountains that attract people to Colorado and there is

not enough public money to protect the remaining open spaces. That is why all of us should support the ranching community in every way we can by supporting land trusts, which implement conservation easements, and legislation that nurtures the ranchers who take good care of these incredibly important lands.



The cows who thrive at 3R Ranch.

¹ Steve Banker "The Grass-Fed Beef Supply Chain, Forbes Magazine, January 29, 2016.

<https://www.forbes.com/sites/stevebanker/2016/01/29/the-grass-fed-beef-supply-chain/#620681d248e5>

² Ranchers, beset by low beef prices, see optimism tested, Jim Holland, Livestock News, February 6, 2017.

<http://www.farmforum.net/2017/02/06/ranchers-beset-by-low-beef-prices-see-optimism-tested/>

Mo Ewing is a retired conservation biologist who fills his leisure hours volunteering for CoNPS, the Denver Botanic Gardens, and the Colorado Natural Areas Program. His interests range from collecting mosses in New England and Colorado, studying the distribution of native plants worldwide, to studying and documenting Colorado plant communities.

From the Editorial Team

Are you willing to contribute to *Aquilegia*? We welcome workshop and field trip reports as well as article and book reviews, feature articles, and member profiles! Please send us an email requesting writer's guidelines. We're also interested in featuring your photos of native plants. Let us know if you'd like to be on our "call list" when we're looking for a specific specimen to accompany an article.

We look forward to hearing from you.

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Plant Profile

Desert Indian Paintbrush

By Judy Kennedy

The grayish-green stems of this herbaceous perennial are usually about 6-16 inches tall. It is bright, it is colorful, it is desert Indian paintbrush (*Castilleja chromosa*). Its alternate, lanceolate leaves grade into lobed flower bracts, often mistaken for the flower petals, which are tipped with a bright orange-red and surround the spiked clusters of inconspicuous, tubular green flowers.

Blooming from April to September, this paintbrush is found on dry, bushy, or rocky hillsides among pines or sagebrush scrub. I have found it on the Monument Trail in the Colorado National Monument outside of Grand Junction. It is a native plant that is established in all states west of the Continental Divide.

Named because each stem is topped with bright red resembling a painter's brush, legend has it that paintbrushes sprang up where an American Indian discarded his brushes after painting a colorful desert sunset. The designation *Castilleja* was named for Domingo Castillejo (1744-1793), a professor of botany in Cadiz, Spain. "Chrom" is Greek for "color"; botanist Aven Nelson named this species from a specimen he collected in 1898.

This partially parasitic plant attaches to other plants by means of root-like projections called haustoria which absorb water and food from the host. It makes only a portion of the nutrients that it requires through

photosynthesis, and parasitizes the roots of other plants for the rest of its food. Its roots grow into the soil until they touch roots of other plants, such as sagebrush. Then they penetrate the tissues of the host plant to steal its food.



Castilleja chromosa. ©Judy Kennedy

Its family is Scrophulariaceae which also includes the snapdragons. *Castilleja chromosa*'s lance-shaped leaves clasp the stem alternately and are long, narrow and hairy. They are divided into three to five narrow spreading finger-like lobes. Stems can be simple or branched from the base. Leaves and stems of the plant have a dense covering of short, rather bristly hairs. Its stems are reddish-

purple, and the leaves, while green in damp conditions, may also have a purplish cast, either just along the edges or all over.

Desert paintbrush is pollinated by butterflies, bumble bees, and hummingbirds, resulting in a fruit that is a two chambered capsule. There are over 200 species of paintbrush in western North American and even an expert botanist can have trouble differentiating among them.

Judy Kennedy is a CoNPS member, a CSU Master Gardener and a Colorado Native Plant Master® who lives in Glade Park, CO. Glade Park is right above the Colorado National Monument where she and her husband, Dave, do most of their hiking.



Restoration Roundup

Working Together to Restore Land

By Renee Galeano-Popp

Wildlands Restoration Volunteers (WRV) is a non-profit volunteer organization based in Boulder and Fort Collins. They organize conservation projects in Colorado and southern Wyoming. Volunteering with WRV builds great friendships, heals the land, and strengthens communities. CoNPS is proud to have partnered with WRV on projects.

Examples of their projects include:

- Post-fire restoration and erosion control;
- Restoration of streams, wetlands, prairie, and alpine areas;
- Trail maintenance, construction, and restoration;
- Tree and native species planting;
- Road removal and revegetation;
- Mitigation of the effects of pine beetle;
- Invasive plant removal;
- Native seed collection; and
- Rare/threatened plant and animal species protection.

The Boulder CoNPS Chapter has partnered with WRV for a couple of projects each year including the annual noxious weed pull. The Northern Chapter has enjoyed talks from two of the WRV staff, Nate Boschman and Luke McNally, who gave presentations on projects in the Big Thompson River and the other in Campbell Valley.

Boulder Chapter member, Robert Ukeiley, participated in a recent WRV project. "WRV has two related missions: to restore land and build community. "Perhaps the best example is the forest fire

mitigation/forest restoration project at the Ben Delatour Ranch near Red Feather Lakes. The project involves mechanically thinning the forest with hand crews near Elkhorn Creek which feeds into the Poudre River. There are a variety of partners on this project including the WRV, the boy scouts, the Coalition for the Poudre River Watershed, and The Nature Conservancy, who owns a conservation easement on the land.

"The WRV task was mainly to remove small diameter trees which would have burned up in the fires that historically would have come through this area every decade or two prior to massive fire suppression. After our thinning, TNC did a controlled burn, which was the first time this forest experienced a fire in over a hundred years."



Ukeiley also said, "I felt a great deal of pride and satisfaction in doing my small part to allow the reintroduction of a critical component of this ecosystem. As to the building community side of WRV's mission, I definitely feel a sense of community as we all work to advance the conservation goal, improve our own skills, and have fun."

For more information about WRV visit their webpage <https://www.wlr.org/>.

Renee Galeano-Popp is a semi-retired botanist/plant ecologist and founder of Project Pine Cone. She is the past president of the Northern Chapter and past co-chair of the CoNPS restoration committee.

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Research and Reports

Reflections on CoNPS Free-List Data

By Donald L. Hazlett, Ph.D.

Introduction The recent ethnobotany workshop in Greeley (Spring 2017) included a review of methods used to collect ethnobotanical information. The classic approach is to carefully interview Native Americans and/or long-term residents using indirect questioning techniques. In Colorado, these persons can be difficult to find. In the case of Native Americans, there are also legitimate concerns of collecting and relaying information they consider to be intellectual property rights or information they simply do not want to share – I do not blame them for this. Another method used to collect plant use information is free-listing. Free-listing is a way to learn the current ethnobotanical uses of persons in a particular group. I have used this methodology with students (grades 4-12 and college students) on the Crow and Pine Ridge reservations as well as in Greeley, Honduras, and Bolivia. The objective of free-list data is to acquire a “snapshot” of plants that are currently utilized by a particular group. Plant uses are dynamic in this regard and change over time.

“Free-listing is a way to learn the current ethnobotanical uses to acquire a “snapshot” of plants that are currently utilized by a particular group.”

Methods The methodology of free-listing is simple. In Greeley, I asked workshop participants, with no examples or hints, to list three medicinal plants they or their immediate family use most often. A second question was to also list three edible plants they use that are not among the most common supermarket plants. Indeed, all foods are medicines, but many are primarily thought of as food. These two open-ended questions (a free-listing) were posed to the 21 participants at the workshop. If all participants were to list three medicinal and three not-so-common food plants, there would be a total of 63 (21 x 3) plant names in each category. To use free-listing survey data as a research tool, the gender, age and homeland of the participants should be collected (not done here). Early in my free-listing days, I would ask participants to list native plants they know as foods or medicines. However, I soon realized that very few students recognize which plants are native and which are exotic.

Results: Medicinal Plants The participants listed 43 medicinal plant species and two mushrooms. Of these, 13 species (30%) were native to North

America, four were indigenous to Latin America, and 28 (65%) were native to the Old World. Scientific names, on the list below, sometimes have only the genus name. Uses are not given, but are readily available in the literature or online.

North American Origin The plant most often listed of 11 native plant and two mushrooms entries was echinacea (*Echinacea purpurea*) with three votes. In a four-way tie for second, with two votes each, were: 1) rose hips (*Rosa* spp.), 2) nettles (*Urtica dioica*), 3) oshá (*Ligusticum porteri*) and 4) mushrooms (chantrelle and morel). The seven remaining North American native medicinal plants listed, each with one vote, were: 1) ponderosa pine (*Pinus ponderosa*); 2) yampa (*Perideridia gairdneri*); 3) chaparral (a vegetation type with many species: perhaps

Arctostaphylos spp.); 4) black elderberry (*Sambucus* spp.); 5) basswood (*Tilia americana*); 6) hawthorn (*Crataegus* spp); and 7) miner’s lettuce/spring beauty (*Claytonia* spp).

Latin American Origin The four medicinal plants

indigenous to Latin American, each with one vote, were: 1) chocolate (*Theobroma cacao*); 2) yerba mate (*Ilex paraguariensis*); 3) mamón (*Melicocca bijuga*) and 4) mucuna (*Mucuna* spp.)

Old World Origin The most often listed of 28 Old World medicinal plants was arnica (*Arnica montana*) with four votes. In a five-way tie for second place, each with three votes, were: 1) aloe vera (*Aloe vera*); 2) chamomile (*Matricaria chamomilla*); 3) mint/peppermint (*Mentha X piperita*); 4) aspirin (*Salix* spp.) and 5) cinnamon (*Cinnamomum* spp). Two Old World medicinals with two votes each were plantain (*Plantago major*) and St. John’s wort (*Hypericum perforatum*). The remaining 19 Old World plants, each with one vote, were: green tea (*Camellia sinensis* from Asia), níspero/loquat (*Eriobotrya japonica* from Japan); lemon (*Citrus X limon*); oranges (*Citrus sinensis*), horehound (*Marrubium vulgare*), lavender (*Lavandula* spp.), cannabis (*Cannabis sativa*), garlic (*Allium sativum*), licorice (*Glycyrrhiza glabra*), cabbage (*Brassica oleracea*), fennel (*Foeniculum vulgare*), spinach (*Spinacia oleracea*), holy basil (*Ocimum tenuiflorum*), asparagus (*Asparagus officinalis*), beet tops (*Beta vulgaris*), ►

◀ rose hips (*Rosa* spp.), bindweed (*Convolvulus arvensis*), parsley (*Petroselinum crispum*), and milk thistle (*Silybum marianum*).

Results: Not-So-Common Edible Plant Species

The participants listed 44 edible plant species and one mushroom. Of these, 16 species (36%) were native to North America, five were indigenous to Latin American, and 24 (55%) were from the Old World. Again, the scientific names are in parenthesis and only the genus is sometimes given.

North American Origin The most often listed of 16 North American native edible plants, each with two votes, were six plants: 1) nettles (*Urtica dioica*); 2) currants (*Ribes* spp.); 3) sand cherry (*Prunus besseyi*); 4) prickly pear (*Opuntia* spp.); 5) portulaca/purslane (*Portulaca oleracea*); and 6) choke cherry (*Prunus virginiana*). The remaining ten North American food plants, each with one vote, were: milkweed (*Asclepias* spp.), buffalo berry (*Shepherdia* spp.), wild turnip (*Cymopterus montanus*), hackberry (*Celtis reticulata*), sunflower (*Helianthus annuus*), kinnikinnik (*Arctostaphylos uva-ursi*), piñon nuts (*Pinus edulis*), wild plum (*Prunus americana*), rose hips (*Rosa* spp.), and wild rice (*Zizania palustris*).

Latin American Origin Two of five edible plants from Latin America were listed twice: quinoa (*Chenopodium quinoa*) and beans (*Phaseolus vulgaris*). The other three food plants indigenous to Latin America were listed once: 1) amaranthus (*Amaranthus hybridus*—now includes *A. hypochondriacus*); 2) corn (*Zea mays*); and 3) chia (*Salvia hispanica*).

Old World Origin The most often listed not-so-common food plants were 24 species from the Old World. The most listed, with four votes, was dandelion (*Taraxacum officinale*). Two plants had two votes: nettles (*Urtica dioica*) and kale and broccoli (*Brassica oleracea*). The remaining 21 Old World food plants, each with one vote, were: Nanking cherry (*Prunus tomentosa*), spinach (*Spinacia oleracea*), rice (*Oryza sativa*), carrots (*Daucus carota*), grapefruit (*Citrus paradisi*), barley (*Hordeum vulgare*), chamomile (*Matricaria chamomilla*), portulaca/purslane (*Portulaca oleracea*), jackfruit (*Artocarpus heterophyllus*), peaches (*Prunus persica*), arugula (*Eruca vesicaria*), figs (*Ficus carica* et al.), apple (*Malus* spp. esp. *M. pumila*), okra (*Hibiscus esculentus*), nasturtium (*Nasturtium officinale*), grape leaves (*Vitis* spp.), European sage (*Salvia officinalis*), cilantro (*Coriandrum sativum*), cinnamon (*Cinnamomum* spp.), corn salad (*Valerianella locusta*), and a mushroom (perhaps *Agaricus bisporus*).

Discussion These data illustrate several of the issues associated with ethnobotanical free-list

surveys. First, even if food plants are listed as medicines, and vice versa, it is not valid to shift responses for plants between categories—these are the data. Also, as often happens, some participants listed only one or two plants in some categories. Incomplete listings are common with students, a reflection of their minimal knowledge of plants. A major exception, however, were Bolivian students. These students quickly asked if they could put more than three names on their lists—some wrote over ten names before they were asked to stop.

Another free-list issue is that some plants are listed in both categories: in this study, this was the case for nettles, corn and cinnamon. Other plants, such as asparagus, cabbage and yampa could easily be listed as foods or medicines. A free-list of common names can easily lead to incorrect identifications. For example, arnica, most often *Arnica montana* from Europe, is used externally as an anti-inflammatory and analgesic. However, another well-known arnica in Latin American is Mexican arnica (*Heterotheca inuloides*: Asteraceae), a plant used for the same purpose. One participant listed “wild turnip,” which was presumed to be *Cymopterus montanus* (as listed above), but it might also refer to timsila (*Pedimelum esculentum*).

A rule-of-thumb, in both market and free-list surveys, is that if more than half of the species listed are exotics, the participants are in an urbanized location. As such, they depend less on native plants for food or medicines. Another list complication is that purslane, nettles, and white button mushroom occur in both the Old and New World. *Portulaca oleracea* is interesting in this regard, because it is usually listed as exotic (Old World), but archeological data from the Southeast indicates it has been in North America for hundreds of years.

In this survey 30% of medicinal and 36% of the not-so-common food species were native to North America. This workshop group must be considered to be urbanized. They should not feel bad, because student free-list surveys in the USA often have much lower numbers of native plants on lists (0-10%).

When, if ever, will these and other exotic plants be considered native to North America?

Reflections Workshop participants demonstrated their well-above average knowledge of native plants. They listed four indigenous plant common names: *yampa* (perhaps “water plant”), *kinnikinnik* (goes with tobacco), *chia* (seed that swells in water), and *oshá* (untranslatable). An untranslatable name, such as elm, oak, and oshá, have no etymology—the name refers to a particular plant or plant group, and means nothing else. Untranslatable names are of ►

◀ special interest to ethnobotanists because they tend to be dominant plants or plants with very important uses, such as oshá, a Tewa word first spelled as 'osa (Robbins et al. 1916).

On the other hand, workshop participants, like everyone else, knew many European plant common names. European plants names can have interesting histories, but these are Old World stories. One example popped up in this workshop free-list survey. The listing of corn salad, an edible European potherb, is also found in a Brothers Grimm story. The Grimm brothers apparently liked corn salad, because they used the German name for corn salad—Rapunzel—as the name of this maiden in their story with the same name. Corn silk may have inspired her long hair.

Rapunzel brings to mind a quote by Roy Bedichek (1947): “Folk names yield beautiful thoughts.... folk whimsies droll or humorous, morsels of straight history, curiously crooked thinking, and much delightful misinformation: ageless superstitions bob up unexpectedly.”

As we read this quote, we usually think of European folklore and superstitions — not those of North American plants. What seems to have been ignored is that Native American plant names have just as many, if not more, insights into perceptions, stories, and connections between people and plants. Early in my career, I accepted without question the plant common names I was taught. I later learned that nearly all of these were Old World in origin. I eventually studied indigenous plant names, such as *yampa* and *kinnikinnik*, and discovered they also have uses and stories that better help us connect to our homeland.

Unfortunately, botanists have kept the colonial baggage of using European plant names for North American plants. We realize that the colonial era had little respect for Native Americans, women, and slaves. Over time, however, slavery has been abolished and women have secured more rights. Meanwhile, we tend to ignore the Native American holocaust. In addition, botanists continue to cling to European common names by using, modifying, and dutifully recopying European names in floras.

One of the biggest problems with the continual use of European plant common names is that the common names, as well as many genera names, are intertwined with Old World cultures. The question is if we should learn names with European, North American, or both histories? To use only European names, as Kimmerer (2013) would say, is to “keep one foot in the boat.”

Let's consider three examples, European names spiderwort (*Tradescantia* spp.), Easter daisy

(*Townsendia* spp.), and bastard toadflax (*Comandra umbellata*). The indigenous, North American names for these same three plants, respectively, are soft and tender, unwinding medicine, and blue medicine or lost blue of the Arapaho. The soft and tender name indicates the use of the spring *Tradescantia* flowers by young Lakota men (with song) to court young women. Unwinding medicine refers to a Navajo use that makes a twine-like ball from many annual plants and then to slowly unravel this ball (a few plants at a time) over many days to relieve stress. Finally, instead of the unflattering bastard toadflax name, the blue medicine and lost blue of Arapaho (Figure 1) refers to the sky blue covering on mature rhizomes that was presumably used as a dye (a lost recipe).



Figure 1. The blue color is evident just beneath the thin bark of *Comandra umbellata* rhizomes (Photo by ©Hugh Mackay). I prefer the Native American name of blue medicine or lost blue of the Arapaho instead bastard toadflax, the colonial name.

Since very few Arapaho remain, the method of this dye preparation may be forever “lost.” These, like many Native American plant names, retain insights, stories and perceptions that could help better connect people to a place—the need for this is great. I recommend that Colorado botanists take the lead in promoting the use of Native American plant names. As a compromise, these can be English translations and in addition to the current common names. This is a way to respect Native American knowledge and a way to help decolonize the Old World plant common naming system produced by colonial regimes.

Bedichek, R (1947) *Adventures of a Texas Naturalist*; p.186.
Kimmerer, R. W. 2013. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teaching of Plants*. Milkweed Editions, Minneapolis, MN.
Robbins, W. W., J. P. Harrington and B. Freire-Marreco. 1916. *Ethnobotany of the Tewa Indians*. Smithsonian Institution, Bureau of American Ethnology, Bulletin 55, Washington DC.

Donald Hazlett, Ph.D. is an ethnobotanist and has been a member of CoNPS for more than 30 years. His expertise is Great Plains ethnobotany and folklore. He is currently working on a book: Natural and Unnatural History of Shortgrass Country. Dr. Hazlett presented “Great Plains Ethnobotany and Folklore” at a CoNPS workshop in April 2017.

Working Together

CoNPS Members Join with Black Canyon Audubon Society Members at Meeting in Delta

By Marcella Fremgen

Ecologist Dr. David Inouye presented a seminar about climate change, phenology, and impacts to wildlife and pollinators on November 16 in Delta. The audience was comprised of 46 people, primarily members from two organizations: Black Canyon Audubon Society and Colorado Native Plant Society.

Both organizations share an interest in providing opportunities to the public for increasing the knowledge of and appreciation for birds and plants, respectively, through education and other programs. These similar missions attract naturalists with similar interests, and the close interactions between plants and birds as pollinators is a topic ideal to create some interaction between the two societies.

Dr. Inouye presented on his 47 years of research at the Rocky Mountain Biological Laboratory in Gothic, Colorado. The small research laboratory houses about 100-150 scientists over summer at a former silver mining town. Inouye's research has focused on phenology of wildflowers over the course of several decades, providing him with the appropriate temporal scale to identify trends and cycles in populations of various species. This longevity is important for climate change research, and paired with extensive weather data from his colleagues at the lab, he has been able to evaluate trends in the climate, the impacts it has on plants, and wildlife responses.

For example, Inouye's research identified that the arrival of the broad-tailed hummingbird is now asynchronous with the peak bloom for glacier lilies, a common food source for the pollinators. When hummingbirds arrive after the peak bloom for the flowers, they miss out on an important food source during summer. Similarly, least chipmunk and marmot emergence is asynchronous with key flowers.

Some other points of interest were research on distributions of plants and their pollinators. Inouye has observed that several species have been moving up in elevation at the bottom of their distribution, although



Erythronium grandiflorum, glacier lily © Kelly Ambler

he notes that his historic plots are too low in elevation to capture any increase in elevation at the top of their distribution. Two examples were *Mertensia* spp. and a bumblebee species that has moved up by 230 meters in altitude from 1974 to 2007.

"Dr. Inouye's long-term studies on how changes in climate affect the high-elevation native wildflowers and their pollinators, like bumblebees and hummingbirds, are really interesting," said BCAS president Bruce Ackerman. "This presentation prompted me to put on my 'bucket list' to visit the Rocky Mountain Biological Lab next summer."

Marcella Fremgen is a private lands range ecologist working to improve habitat for Gunnison Sage-grouse, and a member of Black Canyon Audubon Society. She has also worked at the Rocky Mountain Biological Laboratory in Gothic, and has an interest in the ecological research occurring there.

Article on rare plants captures attention: Several CoNPS members pointed out the relevance of a recent article in *High Country News*: 'Plant Blind in New Mexico' by Cally Carswell *HCN* (2017) 49(20): 20-22. (<http://www.hcn.org/issues/49.20/public-lands-do-threatened-plants-have-enough-visibility-on-state-lands?>)

Review: Journal Article

An Integrated Assessment of the Vascular Plants Species of the Americas

Review by Donald L. Hazlett, Ph.D.

In a recent issue of *Science*, Ulloa Ulloa and 23 others (2017) announced the existence of a newly created database of all plant species known to occur in the New World. Yes, this was a monumental task! This catalog has combined all available databases and includes details on authorship, publication, and geographic distributions for each species. It is available online as a searchable database that is to be periodically updated and expanded to include overlays of climate and additional distributions.

The Vascular Plants of the Americas database is at: www.tropicos.org/Project/VPA. It includes links to wisflora.botany.wisc.edu, SEINet, theplantlist.org, calflora.org, and many other databases—such as all available tropical American databases (e.g., tropicos.org at Missouri Botanical Garden).

Regional and Colorado-oriented botanists may be content to use the plant distribution information in local databases, such as SEINet for Colorado. In fact, a temperate plant species name from our region that is entered into this new Vascular Plants of America database will lead to the distributions provided by SEINet. On the other hand, this database allows us to realize how our floristic interests fit into the floristics of the half-earth area known as the New World. Anyone who has tried to summarize and compare the number the taxa in a floristic checklist with numbers from other regions will recognize the work that went into the following statistics reported in this *Science* article.

The Vascular Plants of the Americas database currently has 124,993 species, which is about 33% of 386,671 plant species known to occur in the world (a recent estimate). During the past 25 years, an average of 750 additional species have been added to the New World flora each year; there is no indication that the number of additional species added per year will decline in the near future. The New World floristic database compiled plant species from 12 New World regions. The number of plant species in each of these 12 regions (from high to low) is shown in Table 1. The third column contains the proportion of species restricted to each area: an indication of regional endemism.

For the record, about 62% of all New World species are in South America. The five genera with over 1,000 species are: *Piper* (1,804), *Peperomia* (1,130), *Epidendrum* (1,459), *Miconia* (1,110), and *Leptanthe* (1,035). The genus *Astragalus* has about 530 species. An interesting comparison is that China, a temperate area about twice the size of North America, also has about twice as many species as North America (30,476 spp.). The authors of this article further estimated that 10%-20% of all New World plant species (mostly tropical) have yet to be discovered and/or described. In Colorado, we have 2%-3% of all New World plants.

Table 1

Region	Number of plant species	Restricted percentage
Brazil	33,161	55%
Colombia	23,104	29%
Mexico	22,969	53%
Peru	19,147	40%
Ecuador	17,584	31%
Central America	16,335	34%
North America	15,447	69%
Venezuela	15,116	22%
Bolivia	14,431	20%
West Indies	10,992	67%
Guianas	8,217	13%
Southern Cone	3,125	45%

To put this into perspective, my home garden has only about nine-tenths of 1% of all New World plants.

Ulloa Ulloa, Carmen, Pedro Acevedo-Rodríguez, Stephan Beck, Manuel J. Belgrano, Rodrigo Bernal, Paul E. Berry, Lois Brako, Marcela Celis, Gerrit Davidse, Rafaela C. Forzza, S. Robbert Gradstein, Omaira Hokche, Blanca León, Susana León-Yáñez, Robert E. Magill, David A. Neill, Michael Nee, Peter H. Raven, Heather Stimmel, Mark T. Strong, José L. Villaseñor, James L. Zarucchi, Fernando O. Zuloaga, Peter M. Jørgensen. 2017. "An Integrated Assessment of the Vascular Plants Species of the Americas." *Science* 358:1614-1617.

Editor's note: Please see page 14 for information on Dr. Hazlett.

New Reporting Tool for Noxious Weeds

By Lara Duran

EDDMapS West is Colorado's new noxious weed database of record, offering more ways to submit data for collection and storage of noxious weed information. Anyone, anywhere in the United States or Canada can enter any non-native species of plant or animal.

This new tool gives the state of Colorado a better handle on where noxious weeds are, and will greatly assist in the protection of native and rare plants if known threats are located nearby. Private land can be flagged so that it can be entered and not displayed to the public.

Data can be entered on the EDDMapS West website, on Google Earth, or via the free mobile app.

For details and more information, visit <https://www.eddmaps.org/west/> and the CDA Mapping website www.colorado.gov/agconservation/noxious-weed-mapping.

Mobile app features allow users to:

- Submit a GPS-tagged photo with a report;
- Save and upload reports offline;
- Identify species of concern, using included images and descriptions of each; and
- Access a glossary of plant ID terms.

Look up reference information and photos of all the non-native, invasive species of weeds in Colorado using this free app. This application offers options to look up weeds via name and locate common mitigation methods for mechanical, biological, and chemical management.

Download both apps free for Apple iPhones or Android phones.

Lara Duran is a CoNPS member, co-chair of the Field Studies Committee, and the noxious weed specialist B for the Colorado Department of Agriculture's conservation services division.



COLORADO
Department of Agriculture
Conservation Services Division

NOXIOUS WEEDS



The People and Pollinators Summit, a Summary

By Robert Trout

Yes, I was one of the lucky people who attended the 2nd annual People and Pollinators Action Network Summit at the Denver Botanic Gardens in early November. With almost 300 people in attendance it was definitely the place to be on a chilly November day. My friend Karen Linder and I (both of us representing the Loveland Initiative for Monarch Butterflies) had planned on attending the conference to learn anything we could to further the monarch butterfly project we run in Loveland, Colorado.

The conference began with Beth Conrey introducing the first keynote speaker, Scott Hoffman Black. Black is the executive director of Xerces, the leading conservation organization for invertebrates in North America. He gave a great talk on integrated landscaping approaches to pollinator conservation.

Karen and I had each signed up for different breakout classes to gain as much knowledge as possible to bring back with us. The subject of my first session was "Community involvement." Jamie Weiss from Audubon Rockies spoke about community projects like the Habitat Heroes project throughout Colorado and Wyoming.

Karen attended "Pollinator Highways: Managing Roadways with Pollinators in Mind" featuring representatives from CDOT and Pheasants Forever.



*A bumble bee works inside a cluster of Parry's Gentian (*Gentiana parryi* Engelm.). ©Mary Menz*

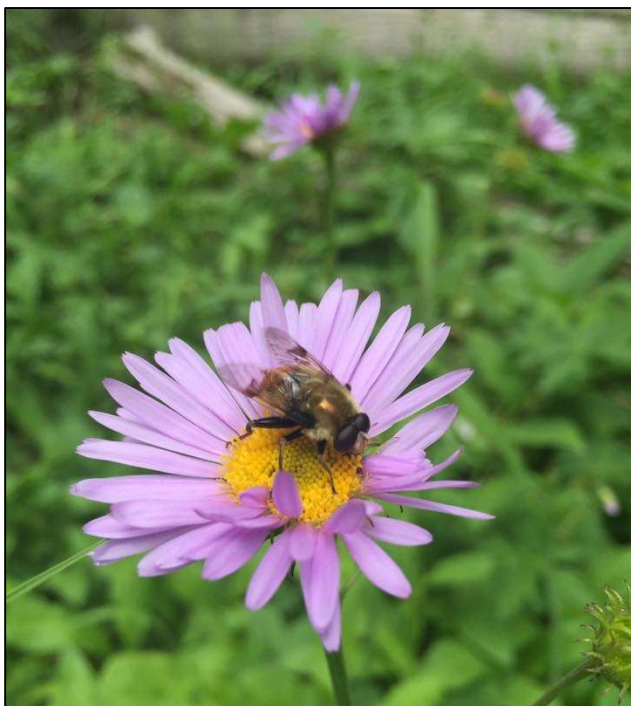
The Colorado Department of Transportation is greatly involved in providing support and development of roadside habitats friendly to pollinators.

After lunch, we broke out for our second session. Jessica Goldstrohm, owner of Bees Waggle, taught me a lot about how to present classes to kids. I also had the opportunity to network with other attendees. Karen attended "Nets and Microscopes," where scientists from Colorado State University and University of Colorado, in conjunction with Scott Black, discussed the techniques and findings regarding the impact of natural disturbance events such as fires and floods on the population and efficacy of our pollinators.

I was seeking advice on how to find a grant writer for a CDOT project I'm working on to help the dwindling midwest Monarch population. I got advice from other attendees that was invaluable, and I've been able to locate a Colorado State University writing professor who's helping me write a great grant proposal.

The seminar ended with some encouraging words from Conrey about the 2018 seminar. I will definitely attend. A very special thanks needs to go out to Joyce Kennedy, chief coordinator for PPAN, who kept me informed of the meeting and encouraged me to attend.

Robert Trout is a member of CoNPS's Northern Chapter. He is also a coordinator for the Loveland Initiative for Monarch Butterflies in Loveland. Trout was a 2017 recipient of the Larimer County Stewardship Award. Bob partnered with the Walt Clark Middle School in Loveland to grow milkweed plants for distribution and planting around northern Colorado. Trout also works with Larimer County Natural Resources to plant milkweed in county open spaces.



Other pollinators besides the well-known bees and butterflies include flies, ants, moths, and hummingbirds, to name a few. ©Mary Menz

News and Announcements

Chapter Reports

Boulder Chapter

Join Boulder Chapter member and volunteer Pat Butler March 13 as she describes her recent travels to Argentina and Antarctica. Her topic is "Plants and Penguins: Travels in Tierra del Fuego, Falkland Islands, South Georgia Island and Antarctica."

Highlights include vascular plants from temperate areas of South America as well as mosses, grasses, and lichens on South Georgia Island, Antarctica. Slides will also include the seven penguin species along with other fauna and the spectacular scenery.

Metro Chapter

Lenore Mitchell, chapter president

In addition to welcoming many new members, our chapter is indebted to those who volunteered in various ways: helping with plant sales, our garden tour, Fall Festival, and the annual conference. We especially thank the fantastic speakers who presented programs in 2017. Getting involved is a great way to socialize, learn, and have fun. Join us!

2017 monthly meetings at Denver Botanic Gardens' Plant Society Building included:

- Rare Plant Conservation at DBG by Jenny Ramp-Neale;
 - Bee Ecology by David Julie;
 - Plant Photography Panel by Loraine Yeatts, Audrey Boag and Kelly Ambler;
 - Native Plant Gardening by Irene Shonle and Mikl Brawner;
 - Walking Tour of DBG native plants and the Green Roof Garden by Jennifer Boussetot; and
 - Extreme Rich Fens by Carol English.
- For December, we enjoyed plant photo slides amidst our holiday party.

Other 2017 events included a plant sale in conjunction with the North American Rock Garden Society in April at DBG, a June garden tour, and an October Fall Festival at the Waterton Audubon Center. In addition, we're grateful to Jannette Wesley for capably coordinating our summer field trips.

In December, we began offering casual introductory botany sessions for forty-five minutes at the DBG Plant Society Building prior to our meeting. Turnout exceeded expectations, so we'll continue offering this and may also plan workshops geared toward new learners. In addition, an extensive reference list is on the CoNPS website under Metro Chapter.

See a list of our 2018 events on the News and Announcements page. Additional chapter events for 2018 include an April 20-21 plant sale at DBG with NARGS and a garden tour possibly in the nearby foothills. Jannette Wesley is again coordinating summer field trips. We hope to offer even more trips, so contact Jannette if you are interested in leading.

Northern Chapter

Renee Galeano-Popp, past president

Hugh Mackay has served as field trip coordinator par excellence for the Northern Chapter for the last seven years. As a Native Plant Master, he is a perennial student of plant identification. Through his many contacts, he arranges field trips far and wide for all interest and capability levels. He exudes enthusiasm towards the plants, the trips, and everyone who participates. To know him is to really love him!



Hugh Mackay Awarded for Excellence

Thanks to Hugh's continual efforts to exceed, in 2017 the Northern Chapter hosted more field trips and enjoyed more participation than ever before. At the October meeting, the chapter awarded Hugh with a plaque for being "The Best Field Trip Coordinator Ever." It acknowledged his hard work, dedication and passion.

As if that isn't enough, Hugh is currently the acting president of the Northern Chapter.

Thank you, Hugh!

Plateau Chapter

New Leadership Committee Announced

Chapter President Stephen Stern decided after six years that he would pass the baton. He thought it would be helpful to have several people in the lead role to split the duties. Several people were approached and it was decided that three was a good number. New chapter leadership is David Varner, Susan Carter, and Jim Pisarowicz. The duties have been split as follows:

- David is attending the statewide meeting and organizing a restoration project for the fall;
- Jim is organizing hikes, potentially focusing on Escalante and Uncompahgre areas; and
- Susan is handling workshops and is working on a cactus workshop around May, a possible photography workshop, and a fall grass workshop by Stephen.

David Varner is relatively new to Colorado, having moved to Grand Junction in 2015. As a restoration ecologist, he brings not only enthusiasm for native plants, but experience as board member and chapter president with the California Native Plant Society. He graduated from the CSU Extension's Native Plant Master® Program, earning the Colorado Flora Certificate in 2016. David currently works for the Tamarisk Coalition, building and coordinating river restoration projects in western Colorado and Utah.

Susan Carter has lived in Colorado since 1993 and Fruita since 2001. She is the Horticulture Agent for

CSU Extension Tri River Area (Mesa, Delta, Montrose, and Ouray Counties) with her focus on commercial horticulture and natural resources. She is the leader for the CO Native Plant Masters Program® in TRA. Susan has worked with plants professionally since the 1980s including managing a nursery in Silverthorne for eight years. Her history with native plants goes back to her childhood. She has a bachelor's degree in Ornamental Horticulture from Delaware Valley College of Science and Agriculture and a master's degree in Landscape Architecture from North Carolina State University.

Dr. Jim Pisarowicz recently retired from a career in government and academia and now lives in Montrose. Jim has taught psychology at Sinclair Community College in Dayton, Ohio, mathematics and statistics at Antioch University in Denver, and psychology at Mesa State University in Grand Junction (currently Colorado Mesa University). He worked for the National Park Service at Wind Cave National Park and with the U.S. Army Corps of Engineers at Caesar Creek Lake. Jim also was the Executive Director of the Death Valley Natural History Association. Jim was a member of the Cincinnati Wildflower Preservation Society and for almost a decade was a major contributor to the Facebook group "Ohio's Wildflowers and Flora - Native, Alien and Escaped." He is currently working on a book featuring some of his wildflower photography.

2018 Event Calendar

Chapter Meetings

(Please check the Events Calendar at CoNPS.org for updated information)

Boulder Chapter Meetings: 2nd Tuesday of the month (usually), Boulder Rural Fire Station, Gunbarrel, 7–8:30 pm

February 13: Dr. Thomas Andrews, CU, "Natural History of the West Side of RMNP", and his book, *Coyote Valley*

March 13: Pat Butler, "Plants & Penguins: Travels in Tierra del Fuego, Falkland Islands, South Georgia Island & Antarctica"

April 10: Laurie Deiter, OSMP, "Control Methods for Invasive Tall Oatgrass, Including Cattle Grazing"

Metro-Denver Chapter Meetings: 2nd Tuesday of the month (usually), Denver Botanic Gardens, Plant Society Building; 6:30–8:30 pm

February 13: Loraine Yeatts, "Flora from the CO River Source to the Gulf of Mexico"

March 12, **Monday:** Panayoti Kelaidis, "Stephen Long's Expedition 200th Anniversary in 2019"

April 3, **first Tuesday:** Tom Zeiner, "Crested Butte Flora and Geology"

April 20-21: **Annual Plant Sale**, DBG

May 15: Scotty Smith, "Colorado Orchids"

July 17: Marcia Tatroe, "Gardening with Natives"

September 11: Cynthia Reiners, "Comparison of Tucson, AZ and Front Range Flora"

October 9: Carol English, "Moffat County Flora"

November 13: Tom Schweich, "Early CO Botanists and Colorado Flora"

December 11: Holiday Party

Northern Chapter Meetings: 1st Tuesday of the month (usually), Gardens on Spring Creek, Fort Collins, 6:30 social; 7-8:30 pm, presentations
February 6: Denise Wilson, Botanist, Wilson & Associates, "Seed Collection for the Dixon National Tallgrass Prairie Seed Bank"
March 7, **Wednesday:** Pam Smith, Botanist, CNHP, "Lake County"
April 3, Maddie Maher, CSU Graduate Student, "Floristic Inventory in Gunnison County"

Plateau Chapter Meetings
Events TBD

Southeast Chapter Meetings: Cheyenne Mountain Library, 1785 S. 8th St., Colorado Springs, 1:30 pm

February 10: Doris Drisgill, "Alpine Wildflowers" (repeated in at the Pueblo Library on February 17, 10:45 am, sponsored by the Arkansas Valley Audubon Society)

Southwest Chapter Meetings: Lyceum in the Center for Southwest Studies, Ft. Lewis campus, 6:30-8:00pm
February 22: Gretchen Fitzgerald, "Oshá, Medicinal Plant of the San Juan Mountains"
March 15: John Bregar, "Wildflowers of the Alps"
April 12: Helen Hamilton "Bryophytes"

CoNPS Board Meetings: JeffCo Extension Office, 15200 W 6th Ave, Golden, Sundays, 10 am to 1 pm; February 4, May 6, October 21, December 2

CoNPS Workshops

Saturdays, 9:00 am – 3:00 pm, unless noted

"Gymnosperms, Conifers, and Pines"

February 3

Presenter: Renee Galeano-Popp, Botanist/Ecologist
Location: Regis University, Claver Hall 306, 3333 Regis Blvd., Denver, CO

This workshop is an overview of the taxonomy and natural history of gymnosperms, conifers and pines of the world. Renee will bring her extensive collection of pine cones and herbarium specimens. Participants will spend the last portion of the workshop observing conifers in the amazing arboretum at Regis University, including some planted by the Dalai Lama.

Renee is a semi-retired botanist and forest ecologist from Northern Arizona University, with twenty years in the US Forest Service, including 3 years as Regional Botanist for Arizona and New Mexico. She has ten years in private consulting, and currently has her own business, Popp Consulting, doing vegetation management mainly with noxious weeds in northern Colorado. Renee is the founder of Project Pine Cone (<https://www.facebook.com/Project-Pine-Cone-200369616643481/>), an educational forum about pines. She served as a CoNPS board member and was the Northern Chapter president.

"Introduction to Wildflowers of the Front Range"

March 3, 9-11:30 am

Presenter: Mo Ewing, Plant Ecologist
Location: Rocky Mountain Arsenal NWR Contact Station, 6550 Gateway Rd., Commerce City, CO

The purpose of this course is to introduce participants to the wonderful world of Colorado wildflowers and to get them started on developing skills to identify different species found in the Denver area. During a slide presentation, Mo will discuss how plants are named and identified, review basic plant morphology, and look at the characteristics of the 13 most common plant families. After a short break participants will take a tour of the most common plants likely to see in Denver, on the plains, in the foothills, montane,

subalpine and alpine locations, while identifying some of the most wonderful places to hike and what wildflowers are likely to be found there.

Mo Ewing is a retired plant ecologist with a master's degree in conservation biology from Antioch New England in New Hampshire. He is a CoNPS treasurer and chair of the Conservation Committee, and volunteers in the Colorado Natural Areas Program and the research lab of Denver Botanic Gardens. Previously, he was the land stewardship director at Colorado Open Lands, a state-wide land trust. His interests range from mapping native plant communities to developing an interactive key to the moss genera of Colorado.

"Restoring Native Open Spaces"

March 24

Presenter: Jim Tolstrup, Director, HPEC
Location: High Plains Environmental Center, 2698 Bluestem Willow Dr., Loveland, CO

This class is a detailed "how to" presentation for homeowner associations, schools, companies, or individuals interested in creating natural areas with restored native vegetation. Topics covered include environmental and economic benefits, plant ►

◀ selections, specific management strategies, and wildlife/plant inter-relationships.

Jim Tolstrup works to promote the conservation, restoration and landscape use of native plants, as the Executive Director of the High Plains Environmental Center in Loveland, CO, a unique model for preserving native bio-diversity in the midst of development.

Jim's past work experience includes serving as Land Steward of Shambhala Mountain Center in Red Feather Lakes and running his own landscape design business in Kennebunkport, Maine where he installed gardens at George and Barbara Bush's "Summer White House."

Jim holds a Certificate in Gardening Arts from the Landscape Institute of Harvard University and the Arnold Arboretum. He has written numerous articles on gardening and environmental stewardship for various publications and is a past recipient of Denver Water's Xeriscape Award and ALCC's Excellence in Landscaping Merit Awards and ASLA Land Stewardship Award.



High Plains Environmental Center



"Designing with Native Plants for Pollinators"

April 7

Presenter: Jim Tolstrup (see March Workshop)

Native pollinators, including butterflies, bees, and birds are declining in Colorado and elsewhere in the US, largely due to habitat loss. This talk will explore ways that home gardeners can help to reverse this trend by utilizing beautiful water-saving, native plants

that provide essential forage and shelter for wildlife. Associations between plants and pollinators will be explored in detail, as well as information on how to grow the plants including height, width, soil and water requirements, and timing of bloom. The program will also include an investigation of how the structure and arrangement of the garden design, and specific cultural practices, can benefit both plants and wildlife.



"Vegetation Mapping and the Influence of Soils on Vegetation"

May 19

Presenters: David L. Buckner, Ph.D. and Carla DeMasters, M.A.

Location: 1077 S Cherryvale Rd., Boulder, CO

The need to map vegetation may arise for purely descriptive purposes or it may provide the basis for long-term landscape management decisions or planning. The first half of the workshop will be an overview of the physical/technological approaches to vegetation mapping followed by discussion of alternative conceptual, philosophical, and ecological approaches that are important to consider in identifying vegetation mapping units.

The second half of the workshop will address the influence of soils on both the natural distribution of vegetation as well as the effects soil characteristics have in the process of rehabilitation or "restoration" efforts. Discussion will include explanation of the soil properties that have shown themselves to be

particularly important to native and naturalized plant growth, the use of soil survey information, and the process and resources available for soil analysis.

David Buckner is a plant ecologist with nearly 50 years of field experience during which vegetation mapping and the need to know and interpret soil characteristics as they affect the distribution of plants on landscapes have been nearly continuous parts of his work. He has conducted workshops for CoNPS since the early 1990s on subjects including Grass Identification, Sunflower Family Plant Identification, Soils, and Landscape Reconstruction. He is an Honorary Lifetime Member of CoNPS and has led many field trips for the society.

Carla DeMasters is a plant ecologist with 15+ years of field experience and advanced training and skills in GIS. She has given several workshops for CoNPS and is a Certified Ecological Restoration Practitioner.

CoNPS Fieldtrips

(Please check the CoNPS Event Calendar for up-to-date information.)

March 7: Lair o' the Bear, Jefferson County. Leader: Lenore Mitchell
April 10: Harrigan Creek, Summit County. Leader: Kelly Ambler
May 10: Roxborough State Park, Douglas County. Leader: Susan Dunn
May 11: Green Mountain, Jefferson County. Leader: Judy King
May 13: Washington Ave. Open Space, Jefferson County. Leader: Tom Schweich
May 26: South Valley Park, Jefferson County. Leader: Carol English

Other Events

ABLS Conference in August

On August 12-16, the Mountain Research Station will be hosting its annual American Biological & Lichenological Society Conference in Nederland. There will be several great talks by students, faculty, etc., as well as field trips. Registration has not yet opened, but watch for the announcement in the coming months.

For more information, contact Erin Tripp (erin.tripp@colorado.edu), Assistant Professor, Department of Ecology & Evolutionary Biology and Curator of Botany at the COLO Herbarium at the University of Colorado, Museum of Natural History



February 10

Landscaping with Colorado Native Plants Conference

Denver Botanic Gardens, Denver, CO
<https://landscapingwithcoloradonativeplants.wordpress.com/>

February 22-24

Colorado Environmental Film Festival

American Mountaineering Center, 710 10th St., Golden, CO
<http://www.ceff.net/festival-info/>

February 24-March 4

Colorado Home and Garden Show

Colorado Convention Center, Denver, CO
<http://coloradogardenfoundation.org/colorado-garden-home-show>

March 1

Saving Endangered Species Youth Art Contest

<http://www.endangered.org/campaigns/endangered-species-day/saving-endangered-species-youth-art-contest/>

Deadline: March 1

March 31-April 1

Colorado Cactus and Succulent Society Show and Sale

Denver Botanic Gardens, Denver, CO
<http://www.coloradocactus.org/2018-show-and-sale>

April 10-11

Great Plains Grassland Summit: Challenges and Opportunities from North to South

Grand Hyatt, Denver, CO
<http://westernforestry.org/upcoming-conferences/great-plains-grassland-summit-challenges-and-opportunities-from-north-to-south>
Note: Abstracts due March 1, 2018

April 27-30

American Penstemon Society Annual Meeting

Las Vegas, NV
<http://penstemons.org/index.php/annual-meetings>

May 3-5

National Meeting of the Center for Plant Conservation

Botanical Research Institute of Texas Fort Worth, TX
<https://saveplants.org/events/>

May 18

Endangered Species Day

May 18

Worldwide Day of Botanical Art

<https://www.botanicalartworldwide.info/>

July 21-23 (optional field trip July 24)
Eriogonum Society Annual Meeting

College of the Siskiyous
Weed, CA

http://www.eriogonum.org/index.php?option=com_content&view=article&id=101&Itemid=127

July 21 - 25, 2018

Botanical Society of America Conference 2018
"Thriving with Diversity"

Rochester Civic Center

<http://www.2018.botanyconference.org/>

Rochester, MN

Note: Abstracts due April 2

Legislative Update

By Brad Klafehn

CoNPS is a member of the Wildlife and Habitat Roundtable, a quarterly meeting between nongame advocates and Colorado Parks and Wildlife management. The CoNPS Conservation Committee is an active member of the Roundtable.

At its January meeting, CPW Director Bob Broscheid began by describing relevant legislation at the state level:

The Mussel-free Colorado Act (HR18-1008) was introduced in the Colorado legislature January 10 (www.leg.colorado.gov/bills/hb18-1008). If passed, it will fund CPW's Aquatic Nuisance Inspection Program by mandating that resident boaters purchase a \$25 aquatic nuisance species stamp. The cost for nonresidents would be \$50. Residents would pay a \$25 stamp fee in addition to the watercraft registration fee. Non-native mussels, such as Zebra Mussels, eat native phytoplankton.

SB18-066 would remove the 2024 sunset date for the Colorado Lottery, making the lottery a permanent organization in state government. Lottery funds make up a sizeable proportion of CPW's budget.

The Future Generations Act is still in the drafting stages. CPW is trying to get legislative permission to better fund their operations, but the legislature has not agreed. This year's effort is scaled down from last year's effort. It would allow an \$8 increase in hunting and fishing fees, adjustable for inflation. For state parks, it would remove a total revenue cap which is now in place and would allow a \$1 increase in the daily pass, and a \$10 increase in the annual pass. Application fees would increase by \$10 for residents and \$20 for non-residents, and a \$10 increase for the resident senior fishing license (currently \$1). CPW is predicting an \$11 million budget shortfall for state parks in 2025 and a \$30 million shortfall for Wildlife without additional funding.

Director Broscheid said that CPW's budgetary woes have been compounded by a recent Colorado Supreme Court ruling on the Colorado severance tax

in response to a suit by BP. The state will have to refund millions in severance tax monies and will not be allowed to collect that portion of the tax in the future. As a result, \$7.5 million in severance tax will no longer come to CPW. This funding cut will start next year. A bill to overturn the Supreme Court ruling died in the legislature last year.

(<https://www.denverpost.com/2016/05/10/bp-wins-severance-tax-deduction-in-colorado-supreme-court-ruling/>)

Nongame Income Tax Check-off and Habitat Stamp Underutilized sources of funding for CPW include the nongame income tax checkoff, which they encourage taxpayers to use. Another is the Habitat Stamp, which can now be purchased for \$10 online, or \$300.25 for a lifetime stamp. The program purchases conservation easements and is able to leverage public funds 3:1 from private sources.
(www.cpw.state.co.us/habitatstamp)

Department of the Interior Revisions to the Sage Grouse Plan. DOI Secretary Zinke has ordered a review of Sage Grouse plans west-wide. CPW would like to see some small tweaks in the plan, said Director Broscheid, but is trying to preserve the plan, working through the Western Governors' Association. He said that the plan really revolves around Wyoming, as the biggest grouse habitat is there, and that Utah, Montana, and Idaho are the most vocal in opposition to the current plan. DOI's memo wanting to revisit sage grouse mitigation caught CPW off guard, and Broscheid said states may have to develop tougher mitigation standards if DOI loosens them.

Ruffed Grouse Range Expansion Plan CPW is in the third year of bringing 50 Ruffed Grouse from Utah into Colorado's Garfield Creek, south of New Castle, to establish a huntable population of this non-invasive, non-native species.

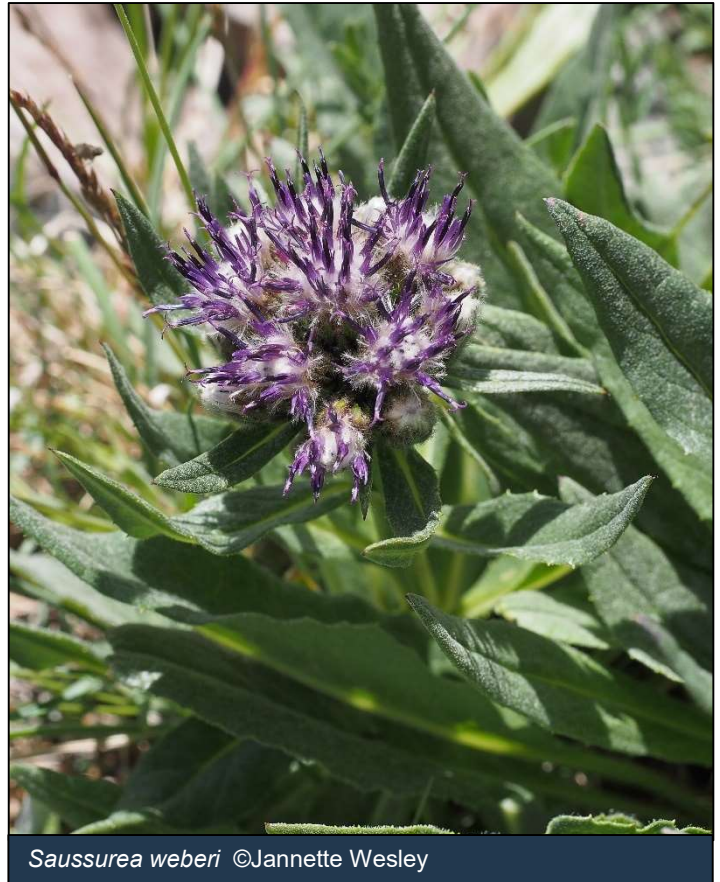
Editor's note: Brad Klafehn is CoNPS' representative to the CPW Wildlife and Habitat Roundtable. The next meeting is in April. Please contact Brad (brad@bradk.org) with items you'd like to see discussed at the meeting.

Member Profile: Jannette Wesley

Submitted by Lenore Mitchell

Jannette Wesley, who grew up in Littleton, Colorado, is a lifelong gardener who was influenced by her mother, a terrific gardener who loved hiking amidst wildflowers. Jannette's interest in native plants blossomed twenty years ago during a week-long field class with a Colorado Trail education program near American Basin in Hinsdale County. Upon receiving a CoNPS brochure during class, Jannette joined and has been an active member ever since, first assisting previous chapter president Vickie Trammel, and later on assuming the presidency of the Metro-Denver Chapter herself for several years. She still coordinates Metros' annual field trips, and her lovely Lakewood garden appeared on the 2017 CoNPS garden tour.

Jannette is an avid amateur who enjoys how native plants provide visual diversity in the garden, and she loves studying their habitats, differences and adaptability. She continues learning by spending time in the field observing plants, and by taking CoNPS workshops as well as attending meetings of the American Penstemon Society, the Eriogonum Society and the Rocky Mountain Conservancy. As a certified



Saussurea weberi ©Jannette Wesley



Jannette in the mountains at the Crested Butte Wildflower Festival. © Lenore Mitchell

Native Plant Master®, she teaches NPM classes for CSU Metro to Mountains program.

Other interests include birding, for which she's traveled not only in the USA but also to destinations such as the Galapagos, New Guinea and Costa Rica, among others. Closer to home, she helps monitor raptors, and also butterflies, as a volunteer naturalist at Roxborough State Park.

If she had a life do-over, Jannette would become a range manager because of the opportunity to ride horses, enjoy wide open spaces and help landowners manage property.

As for advice, especially for those new to botany and perhaps feeling overwhelmed, Jannette reminds them to relax and enjoy the flowers, adding it's ok if you can't remember the scientific name of every plant – that's why we have guidebooks! Sage advice for us all!

Lenore Mitchell, the current Metro-Denver Chapter president, is a long time member of CoNPS and an avid amateur who has taught Native Plant Master® courses for over a decade. Macro photography, hiking and gardening with natives also keeps her busy.

CoNPS Membership

Name _____
Address _____
City _____ State _____ Zip _____
Phone _____
E-mail _____
Chapter (if known) _____

CHAPTERS: Boulder, Metro-Denver, Northern (Ft. Collins-Greeley), Plateau (Grand Junction & West Slope), Southeast (Colorado Springs-Pueblo), Southwest (Durango) or Unaffiliated

If this is a change in address, please write your old address here.

Address _____
City _____ State _____ Zip _____

☐ **Check box to receive information on volunteer opportunities**

Most members receive the *Aquilegia* newsletter electronically.

☐ Check the box if you would like to receive the printed copy of *Aquilegia*.

DUES include *Aquilegia* newsletter, published quarterly.

Membership dues cover a 12-month period.

☐ New ☐ Renewal

☐ Student \$17 ☐ Senior (65+) \$17 ☐ Individual \$25
☐ Family \$35 ☐ Plant Lover \$50 ☐ Supporting \$100
☐ Patron \$250 ☐ Benefactor \$500 ☐ Life Member \$800

CONTRIBUTIONS to CoNPS are tax deductible:

John Marr fund for research on the biology and natural history of Colorado native plants \$ _____

Myrna P. Steinkamp Memorial fund for research and other activities to benefit the rare plants of Colorado \$ _____

Total included: \$ _____

Please make check payable to:
Colorado Native Plant Society

Send completed form and full remittance to:
CoNPS Office
PO Box 200
Fort Collins, CO 80522



Colorado Gives Day Raises \$9,145



On behalf of the Colorado Native Plant Society, thank you for your generous donations through Colorado Gives Day on Tuesday, December 5. This is the second year that CoNPS has participated in the annual day of giving along with nearly 2,300 other nonprofits. Last year CoNPS raised \$1,765 through Colorado Gives and our 2017 goal was to surpass that amount by at least \$3,000. Thanks to 53 donors (listed below), CoNPS raised \$9,145!

With these generous donations, CoNPS will increase the John W. Marr Research Grant Fund, the Myrna P. Steinkamp Memorial Research Grant Fund and the General Endowment fund; and publish a book

donated by Jack and Martha Carter to CoNPS. A special thanks to Constance Holsinger and the Terra Foundation for a very generous donation to print the book. It is CoNPS members that make our organization strong. Thank you all for helping CoNPS advocate for the flora of our state.

Many a 'Thank you!' to: Anonymous (13 donors), Nancy Alexander, Linda Boley, Bonita Bowman, Marie Caldwell, Jack and Martha Carter, Thomas Chaney, Ann Duncan, Bayard (Mo) Ewing, Ann Frazier, Candace Galen, Thomas Grant, Ann Grant, Gail K. Gray, Alice Guthrie, Ellen Heath, Carol Heepke, Katherine Hogan, Constance Holsinger, Mary J. Howell, Michael Kiessig, Gwen Kittel, Bruce Leigh, Deborah Martin, Mary McCrimmon, Elizabeth Naughton, Curtis Nimz, Elizabeth A. Otto, Elaine Probasco, Pauline Reetz, Trevor Roberts, Jackie Sanderson, Danielle Solomon, Robert Stallard, Robert A. Trout, Jill Warner, Sally Waterhouse, Vivian L. Wilson, Loraine Yeatts, Lynne Yockey.

Can you ID these plants from the Crested Butte area?

By Lenore Mitchell

Answers below



Answers (Clockwise from top left): *Agastache urticifolia*, Giant Hyssop, Lamiaceae (mint) family; can be three feet tall or more, abundant in dry montane meadows. *Pedicularis procera*, Giant Lousewort, Orobanchaceae (broomrape) family; can be 4-5 feet with two-foot long fern-like basal leaves, found in montane forest and meadows. *Sidalcea candida*, White Checker Mallow, Malvaceae (mallow) family; 16-40 inches tall, found in wet meadows near montane ponds. *Mitella pentandra*, Tiny Green Miterwort, Saxifragaceae (saxifrage) family; 6-8" tall, found in moist shady areas. Photos © Lenore Mitchell, photographed July 2017. Used with permission.



Colorado Native Plant Society

P.O. Box 200

Fort Collins, Colorado 80522

<http://www.conps.org>

The **2018 Spring Plant Sale** is Open for Business

New Plants, New Sizes

Order at
conps.org/2018-spring-plant-sale/
before April 15

Pick up your plants in 4 locations
Saturday, May 5th
Loveland, Littleton, Boulder,
Colorado Springs



The lovely underside of desert gold (*Geraea canescens*).

Super Bloom *continued from page 5*

desert puffball (*Podaxis pistillaris*), desert chickory (*Rafinesquia neomexicana*), and crowds of lavender gilia (*Gilia cana* ssp. *triceps*). As our shadows lengthened at the summit of Ubehebe Crater, a very young volcanic feature, we walked the rim trail across cinders dotted with desert golden poppy (*Eschscholzia glyptosperma*).

Back Home

Back over the snowy Colorado passes and on our way home, the beauty still gripped our consciousness. "Why not make a Shutterfly photo book for our grandchildren?" asked Karen. That done, "We could make a book for publication."

Oh, the work! Learning to use Photoshop Elements, learning two book-making programs, and most intense—using the USDA Plants Database, Calflora, and Desert USA websites along with the Death Valley Flora Checklist to identify the plants snapped with our cell phones and Karen's iPad. Many thanks to all who helped us!